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ACTION MEMORANDUM

DATE: July 29, 2011

SUBJECT: Action Memorandum for a Non-Time-Critical Removal Action at the Jorgensen Forge Early Action Area of Lower Duwamish Waterway Superfund Site, Seattle, Washington

FROM: Shawn Blocker
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TO: Richard Albright, Director
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Site ID: U.S. EPA Docket No. CERCLA 10-2003-0111

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the selected non-time-critical removal action (NTCRA) described herein for the Jorgensen Forge Early Action Area (EAA) of the Lower Duwamish Waterway (LDW) Superfund Site, Seattle, King County, Washington (Figure 1). The Jorgensen Forge EAA NTCRA consists of the removal and disposal of approximately 1.6 acres of contaminated marine sediments (Figure 2). The proposed NTCRA is expected to be conducted by potentially responsible parties (PRPs), Earle M. Jorgensen Company (EMJ), and Jorgensen Forge Corporation, (collectively, "Jorgensen"), with oversight by EPA pursuant to an EPA enforcement order, preferably on consent, to be negotiated or otherwise issued after the issuance of this Memorandum. These PRP's performed the recently completed Engineering Evaluation/Cost Analysis (EE/CA) for this NTCRA pursuant to such an order.

II. SITE CONDITIONS AND BACKGROUND

The CERCLIS ID No. is WAN0002329803 and the Site ID No. is 10DT.

The LDW Superfund Site consists of an approximately 5.5- mile engineered waterway, formerly the northern portion of the Duwamish River which flows into Seattle, Washington (see Figure 1). It was listed on the National Priorities List (NPL) on September 13, 2001. EPA and the Washington State Department of Ecology (Ecology) jointly issued an order on consent pursuant to CERCLA and the state Model Toxics Control Act (MTCA) for a remedial investigation and feasibility study (RI/FS) for the LDW Site on December 21, 2000, to The Boeing Company (Boeing), City of Seattle (City), Port of Seattle (Port) and King County (County). A Record of Decision is anticipated within the next few years. EPA and Ecology also agreed for their mutual convenience in a Memorandum of Understanding that EPA will generally be lead agency for in-water portions of the LDW Site and Ecology will generally be lead agency for upland source control, and that the Agencies may alter these lead-support roles at any time for any portions of the LDW Site.

The Agencies have followed this general division of responsibility for the Jorgensen Forge facility (Jorgensen Forge or Facility) as a whole. The Jorgensen Forge EAA is a portion of one of five EAAs identified during the RI by EPA and Ecology to address sediment hot spots. That EAA included contaminated LDW sediments fronting both Jorgensen Forge and the larger adjoining Boeing Plant 2 facility immediately to the north. Plant 2 is a Resource Conservation and Recovery Act (RCRA) treatment, storage, disposal (TSD) facility whose sediments will be addressed, contemporaneously with Jorgensen Forge sediments, as RCRA corrective action pursuant to an EPA RCRA Order on Consent issued to Boeing. For the purposes of this Memorandum, Jorgensen Forge EAA will refer to the Jorgensen Forge sediments only, unless otherwise stated, since this Memorandum does not address the Boeing Plant 2 facility sediments except for a small Transition Zone overlapping the sediment boundary between the facilities' separate areas of responsibility that both Jorgensen and Boeing will have full responsibility for in their separate EPA Orders. A separate MTCA Order on Consent for Jorgensen Forge uplands has been issued by Ecology, and it and any subsequent Facility uplands orders should be issued and overseen by Ecology.

For purposes of this NTCRA, the area to be addressed is the 1.6 acres of sediments and slope adjacent to Jorgensen Forge, including the Transition Zone. The Facility was originally developed by the U.S. Navy in 1942 for the production of naval equipment (e.g., propeller shafts). Facility operations included forging, heat-treating, and machining. In 1945, Isaacson Iron Works purchased the property and equipment from the U.S. Navy and continued to operate until 1965 as a fabricator of structural steel, tractors, and road equipment. In addition, Bethlehem Steel operated a steel distribution center on the northwestern portion of the Facility from approximately 1951 to 1963. From 1965 to 1992, the Facility was owned and operated by EMJ and continued to operate in a similar fashion. From 1992 to the present, the Facility has been owned and operated by Jorgensen Forge Corporation.

A. Site Description

1. Removal Site Evaluation

The Jorgensen Forge EAA is characterized by gently sloping intertidal mudflat habitat, with a steep partially vegetated riprap bank. It is bounded to the east by a relatively flat Facility upland area, to the north by Boeing Plant 2 sediments, to the south by sediments adjacent to a former Isaacson facility now also owned by Boeing, and by additional LDW sediments to the west. The area to be remediated is depicted on Figure 2.

The Bethlehem Steel operations noted above consisted of cutting prefabricated steel rods to customers' specifications (Anchor and Farallon, 2008a). The above-ground structures associated with the distribution center were removed shortly after these operations ceased. The only significant subsequent development occurred in the late 1960s in the Facility's EMJ era, when the westernmost portion of the main manufacturing building was extended adjacent to the abutted sheetpile and concrete panel wall on the southwest corner of the Facility.

A review of aerial photographs identified the general types of land use activities and shoreline modifications adjacent to the remedial action boundary (RAB). Prior to the construction of the Facility, the upland area directly adjacent to the RAB was undeveloped land with a small embayment and the former Slip 5 to the south. Upland development was initiated circa 1942, and a 1944 aerial photograph

shows a large L-shaped building occupying the eastern and southern portion of the upland property (which still exists today) and a railroad trestle extending across the embayment.

Some of the piles that historically supported the trestle still exist along the RAB shoreline. No information regarding the use of the railroad trestle or any associated aquatic land uses were identified. By 1946, the railroad trestle is no longer present and the large embayment and adjacent shoreline areas were filled to effectively straighten the shoreline. By 1956, the Bethlehem Steel distribution center had been constructed on the northwest portion of the property. By 1969, it had been removed and the sheetpile wall installed adjacent the LDW.

Three storm drains service the property and discharge into the LDW subject to a Washington State General Industrial Discharge permit. Two additional storm drains, now abandoned, historically discharged from the Facility into the LDW. These two storm drains are identified as an inactive Boeing 15-inch storm pipe and directly-adjacent an inactive 24-inch property line storm pipe that transit the northern Facility property boundary (Figure 2). Historical inputs to the Boeing 15-inch property line storm pipe were solely from Plant 2. Stormwater inputs to the 24-inch property line storm pipe occurred historically from Plant 2, the Facility, Boeing Field/King County International Airport (KCIA) and City of Tukwila stormwater drainage. Boeing completed a removal action pursuant to an EPA Order on Consent in March of 2011. It consisted of cleaning and closure of the concrete portions of the full extents of both storm pipes near the northern boundary of the Facility to remove and prevent continued discharge of stormwater through known PCB contamination to the LDW.

For this NTCRA, the primary contaminants of concern (COCs) are PCBs and metals in the sediments and adjacent slope. The primary source of PCB contamination is historic releases from Boeing Plant 2, including from the above mentioned storm drains. Releases from Facility operations are the primary source of the metals.

2. Physical Location

The Jorgensen Forge EAA is situated on the west bank of the LDW, approximately ½ mile south of the South Park Bridge. The Facility occupies approximately 20 acres at 8531 East Marginal Way South in Seattle, Washington, and is located directly east of the RAB. The Facility contains an approximately 124,000-square-foot building of prefabricated steel that houses a Machine Shop Area, Forge Shop Area, Hollowbore Area, Melt Shop Area, Heat Treat Area, and Shipping Area (Figure 2). The Facility also contains a building that houses an Aluminum Heat Treating Area and several smaller buildings used for offices, a metallurgical laboratory, and storage areas.

The Facility is currently used as a steel and aluminum forge that produces custom steel and aluminum parts forged and machined to high precision specifications for various industrial clients. The major operations conducted include:

- Melting scrap steel and forming the molten steel into ingots
- Forging the steel ingots into billets and/or shape forgings
- Heat-treating the forged steel and purchased aluminum products
- Grinding and machining the steel billets to required specifications
- Ring rolling and/or expanding the aluminum products to required specifications

The LDW, including the Jorgensen Forge EAA, is within the treaty-protected fishing grounds of the Muckelshoot Indian Tribe, and in very close proximity to those of the Suquamish Indian Tribe. No seafood from the LDW other than salmonids should be consumed by people according to advisories issued by the Washington State Department of Health. Recreational activities within and near the EAA include kayaking, canoeing, and motor boating.

Threatened or endangered species potentially occurring within the local area include Chinook salmon (*Oncorhynchus tshawytscha*), Puget Sound steelhead (*Oncorhynchus mykiss)* and Bull trout (*Salvelinus confluentus*). The LDW including the EAA are designated critical habitat for Chinook salmon and bull trout. Designated habitat for steelhead is currently under development.

There are no known potential historical landmarks and/or structures with historical significance identified at the Jorgensen Forge EAA.

Specific meteorological data for this area is as follows: The average rainfall/snowfall is 36"/year, the average temperature is 53°, the average high 79°, the average low 30°, extreme high 95°, extreme low 16°, the average/peak wind speeds are 8 to 39 mph with gusts to 53 mph with the prevailing wind direction to the south.

3. Site Characteristics

Jorgensen Forge sediments cover approximately 1.6 acres and consist primarily of intertidal and subtidal sediment. The EAA extends from the top of the shoreline bank; at an elevation of approximately +13.8 ft mean lower low water (MLLW), into the LDW, at an elevation between 0 and -19 ft MLLW, and terminates at the federal navigation channel. It is bordered by Boeing Plant 2 sediments to the north, Boeing former Issacson facility sediments to the south, the LDW to the west and the Jorgensen Forge upland Facilty to the east. No portion of the Jorgensen Forge EAA is federally-owned.

Nearly all of the Jorgensen Forge shoreline is steep with portions covered by vegetation, underlain with concrete slabs, rock, debris, and includes a sheetpile/concrete wall to the south.

4. Release or threatened release into the environment of a hazardous substance, or pollutant, or contaminant

Sediments: Documented hazardous substances releases include PCBs, metals, and semivolatile organic compounds (SVOCs) in sediments and/or shoreline bank soils above the Washington State Sediment Management Standards (SMS) Sediment Quality Standards (SQS) which were used to establish the sediment boundaries of the EAA, and as set forth in Section V.4 below, are the removal action levels (RvALs) for this NTCRA. Total PCB SQS exceedances were identified in surface and subsurface sediment over a wide range, both vertically and horizontally. Additionally, all identified surface and subsurface SQS exceedances for the full range of SMS analytes were co-located with total PCB SQS exceedances. Only two subsurface samples contained SQS exceedances for hazardous substances (arsenic, lead, and zinc) in addition to PCBs.

Detected organic carbon (OC) normalized PCB concentrations in sediments ranged from 0.3 to 1,251 mg/kg OC. Concentrations are expressed in this manner rather than as dry weight concentrations for

purposes of comparison to the SMS numerical criteria which are expressed as OC normalized concentrations.

Four metals were detected within the surface sediment and bank of the EAA above SQS. Chromium was so detected in five samples with a maximum concentration of 10,600 mg/kg. Copper was detected in two samples with a maximum concentration of 2,820 mg/kg. Lead was detected in 7 samples with a maximum concentration of 64,900 mg/kg and zinc was detected in 8 samples with a maximum concentration of 17,500 mg/kg.

Four semi-volatile organic compounds (SVOCs) were also detected above the SQS within the sediments and bank of the EAA. The four SVOCs included flourene, phenanthrene, butyl benzyl phthalate, and phenol, ranging in concentrations from 8.9 to 1,100 mg/kg. All of the SVOCs are contained within the PCB footprint.

Shoreline Debris Fill. An outfall reconnaissance survey performed in May 2003 identified two debris piles (the North Debris Pile and the South Debris Pile) at the toe of the bank, slightly north of the sheetpile wall area near Outfall 004. The debris piles are composed of black solid asphalt-like material containing nails and other miscellaneous molten metal debris. Six samples were collected in August 2004 consisting of sediment entrained in the debris and composited. The total PCB concentrations detected in the North Debris Pile and the South Debris Pile were 2.34 and 2.06 mg/kg, respectively. Copper and lead concentrations significantly exceeded the SQS criteria in the samples collected from both debris piles, and chromium and significant zinc SQS exceedances were detected in the sample collected from the North Debris Pile.

Shoreline bank-face fill sampling was conducted in August 2004. This sampling included collection of eight fill samples (SS-1 through SS-8) for analysis of total PCBs and metals. The bank-face total PCB concentrations range from 0.0255 to 4.54 mg/kg (Table 2-4). The total PCB concentrations detected at stations SS-1, SS-5, and SS-8 were 0.3230, 0.1967, and 0.1696 mg/kg, respectively. The concentrations of PCBs in soil samples collected from sample locations SS-2, SS-3, SS-6, and SS-7 ranged from 1.443 mg/kg at station SS-3 to 4.54 mg/kg at station SS-6.

Sediment Seep Water: Sediment seep surveys (fluids visually observable seeping through the sediments) and sampling were conducted as part of the Phase 2 RI for the LDW site. Seep water samples were collected and analyzed for filtered and unfiltered metals, SVOCs, PCBs, organo-chlorine pesticides, volatile organic compounds (VOCs), total organic carbon (TOC), dissolved organic carbon (DOC), and total suspended solids (TSS). In addition, conventional water quality parameters (conductivity, temperature, dissolved oxygen, pH, and oxidation-reduction potential) were measured and seep flow rate was calculated. There were no detections of SVOCs, VOCs, organo-chlorine pesticides, PCBs, TOC, and DOC above the laboratory reporting limits. Total suspended solids (TSS) was estimated at 4.3 milligrams per liter (mg/L). Concentrations of arsenic, cadmium, copper, lead, mercury, nickel, silver, and zinc were detected above the laboratory method reporting limits, but below the screening levels identified to be protective of LDW surface water.

Sediment Porewater: Porewater samples were collected from six nearshore sediment stations as part of the Phase 2 LDW RI adjacent to the northwest corner of the Jorgensen Forge Facility to assess risk to benthic invertebrates. Four VOCs were detected at the following maximum concentrations: 1,1-Dichloroethane: at 0.3 micrograms per liter (µg/L), Cis-1,1-Dichloroethene with a maximum detection

of 1.7 µg/L, trichloroethelyne (TCE) at 0.2 µg/L and Vinyl chloride and a maximum detection of 13 µg/L.

Upland Soil: This data include surface soil samples from the chip storage and slag storage areas on the southwest portion of the Facility, and subsurface soil samples to a maximum depth of 16 feet below ground surface (bgs) across the Facility since 1994. PCBs have only been detected in soils on the western or shoreline portion of the Facility, except for a single shallow subsurface soil sample collected at a depth of 2 feet bgs from the Facility interior.

Upland Groundwater: Forty-two groundwater samples have been collected from 14 monitoring wells and 17 borings on the Facility and analyzed for PCBs. PCBs have not been detected in groundwater, with the exception of a June 2003 groundwater sample collected from monitoring well MW-6. Total PCBs, consisting of a combination of Aroclor 1254 and Aroclor 1260, were detected at a concentration of 0.41 µg/L, which exceeds the screening level of 0.27 µg/L. The June 2003 groundwater sample collected from monitoring well MW-6 was collected by Boeing to evaluate the presence, nature, and extent of PCBs in soil and groundwater attributable to releases from Plant 2. This investigation included the collection and laboratory analysis of soil and/or reconnaissance groundwater samples from 10 borings on the Facility for PCBs.

Groundwater samples collected as part of ongoing groundwater monitoring and sampling of the Facility by Jorgensen in April 2003 (prior to the June 2003 Boeing investigation) did not detect concentrations of PCBs above the laboratory practical quantitation limit (PQL) in the groundwater sample collected from monitoring well MW-6. In addition, the laboratory analytical results of a groundwater sample collected by Jorgensen from monitoring well MW-6 during the January/February 2008 groundwater monitoring and sampling event did not detect PCBs in groundwater above the laboratory PQL. No other COCs have been detected in uplands monitoring wells.

The migration pathway for discharge of groundwater is complete but concentrations of PCBs have not been detected in groundwater exceeding the screening levels, with the exception of single anomalous detections of PCBs in groundwater collected from single monitoring wells located in discrete areas of the Jorgensen Forge EAA.

5. NPL status

The Jorgensen Forge EAA is geographically within the LDW Superfund site listed on the NPL on September 13, 2001.

6. Maps, pictures, and other graphic representations

Relevant figures are attached to this memorandum.

B. <u>Other Actions</u>

2. Current actions – Storm drain removal.

Cleanup of the LDW under CERCLA (Superfund), other than in EAAs, will be remedial (rather than removal) action. Jorgensen Forge was identified as an EAA (or part of an EAA) that required cleanup as a result of risks to human health and the environment from high PCB and metal concentrations in the

sediments and soils, groundwater (as a source to sediments and surface water) and surface water. There are no other actions associated with the Jorgensen Forge EAA except as follows. Potentially significant nearby sources of recontamination were considered during the EE/CA.

Potentially significant Jorgensen Forge upland sources of recontamination, particularly for metals, were continued erosion of bank material and a 24 inch storm drain line that drained portions of Boeing Field and East Marginal Way. The 24-inch storm drain line was the primary source of potential recontamination from PCBs. For this reason, removal of the banks and surface water management are part of this NTCRA. Contaminant loading from the 24 inch storm drains was addressed through a separate NTCRA completed in May of 2011 with partial removal and plugging of the 24 inch storm drain line.

C. State and Local Authorities

1. State and local actions to date

As part of their work sharing agreement for the joint management of the LDW Site, EPA and Ecology agreed EPA would be the lead agency for the sediments and bank of this EAA. Ecology has the lead for the upland portion of the site and is currently addressing it under a MCTA Order. The Muckelshoot Indian Tribe, Ecology, and the Duwamish River Cleanup Coalition (DRCC), the LDW Technical Assistance Grant (TAG) recipient have followed the development of this NTCRA and are supportive of the cleanup decision.

2. Potential for continued State/local response

Coordination with Ecology will continue throughout the NTCRA. Tribes (Muckelshoot and Suquamish) and other stakeholders will continue to be fully informed.

D. Tribal Interests

For the LDW Site, including EAAs and source control actions, EPA has initiated formal consultation with the Muckleshoot and Suquamish Tribes. These Tribes have participated in document reviews, special meetings upon request, and frequent coordination meetings such as quarterly updates and project-specific briefings. For this removal action, EPA has provided information to the Tribes at LDW quarterly meetings and has asked the Tribes if they have any concerns about the proposed removal action. Most recently, in December of 2010, EPA provided a project update to the Muckleshoot Tribe and it did not express any environmental or cultural resources concerns related to the removal action for EPA to consider.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

The current conditions at this EAA meet the following factors which indicate that it is a threat to the public health or welfare or the environment, and a removal action is appropriate under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) , 40 C.F.R. § 300.415(b)(2). Any or all of these factors may be present at a site, and any one of these factors may determine the appropriateness of a removal action.

Consistent with EPA guidance for conducting an EE/CA, a streamlined risk evaluation was conducted for the Jorgensen Forge EAA (Section 3.0 of the EE/CA) to assess risks from exposure to contaminated sediments and upland soils in the absence of a removal action. The streamlined risk assessment is based on this EAA serving as a source of contamination to the LDW and the resultant unacceptable levels of contaminants in fish and shellfish that pose a risk to consumers of resident LDW seafood based on Tulalip Tribe's fish consumption data. The LDW RI risk assessment has also been used and made a part of the Administrative Record for this NTCRA.

1. Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants (300.415(b)(2)(i)).

Primary exposure pathways for human health and ecological risks are direct contact with contaminated sediment, and/or contaminated bank soils, and ingestion of contaminated LDW fish and/or shellfish by people and ecological receptors of which river otter are the most sensitive according to the LDW ecological risk assessment. Arsenic, PCBs, and cPAHs are human carcinogens which accumulate and magnify in the aquatic food chain. The remaining detected constituents (lead, zinc, copper, and chromium) are not considered carcinogenic but are nevertheless toxic to aquatic organisms and/or people in concentrations that exceed regulatory or risk-based threshold criteria (RBTCs).

As noted above, because sediments adjacent to both the Plant 2 and Jorgensen Forge facilities contain commingled releases the LDW CERCLA process initially administratively identified them as a single EAA. Amendments to Boeing's and Jorgensen's respective RCRA and CERCLA Orders with EPA require that the Plant 2 and Jorgensen Forge respective early action cleanups be coordinated to address sediments particularly in what has been called the "Transition Zone" between the two facilities at the south end of Plant 2 sediments and the north end of Jorgensen Forge sediments. PCB releases from the Jorgensen Forge facility are believed by EPA to be minor compared to those from Plant 2. In addition to comingled PCB releases, metals contamination believed by EPA to have been released primarily from the Jorgensen Forge facility will be addressed in the Transition Zone. Since these sites are planned to be remediated cooperatively, the following is an explanation of RCRA process under which cleanup standards for Plant 2 were developed, and how they are completely consistent with the development of cleanup standards for other LDW EAAs such as the T-117 EAA, and for this EAA.

The RCRA corrective action process for Plant 2 required the development of Target Media Cleanup Levels (TMCLs), and ultimately Final Media Cleanup Levels (FMCLs), for all contaminated media and hazardous constituents of concern at the facility. TMCLs are set at levels that are protective of human health and the environment. They are similar to Preliminary Remediation Goals (PRGs) in the CERCLA remedial process. Generally, federal or state regulatory standards establish minimally acceptable amounts or concentrations of hazardous constituents (generally hazardous substances under CERCLA and MTCA) that may remain in or be discharged to the environment, or minimum standards of performance for the selected remedy. Risk-based Threshold Concentrations (RBTCs, at times referred to as RBCs without the word "Threshold") based on risks to human health or the environment often dictate setting more stringent standards for cleanup or remedy performance. For hazardous constituents that bioaccumulate and magnify through the food chain, like PCBs, TMCLs are often based on RBCs which are significantly more stringent than regulatory criteria (e.g., regulatory criteria may have been established for a different purpose or at an earlier time). While CERCLA sites are required to perform

baseline risk human health and ecological risk assessments as part of a remedial investigation feasibility study (RI/FS), RCRA sites may not, and the Boeing Plant 2 RCRA facility investigation/corrective measures study (RFI/CMS) did not. The TMCL/FMCL process outlined above is an alternative means to CERCLA baseline risk assessments for the development of RBCs. Consistent with EPA's One Cleanup Program Initiative, the CERCLA remedial action and RCRA corrective action processes yield fundamentally consistent results.

The only relevant minimum regulatory criteria or standards for Jorgensen Forge and LDW-wide sediments are in MTCA and the SMS (which are part of MTCA), which are CERCLA applicable or relevant and appropriate requirements (ARARs), and are followed without that designation under RCRA. The SMS contain specific numerical standards for the protection of benthic invertebrate organisms which live in marine sediment (and are a critically important part of the food chain). There are however, no SMS or other state numerical standards for the protection of human health, including human consumers of fish and shellfish, or for other biological resources such as birds, fish, or other mammals such as river otter. TMCLs for protection of these receptors at Boeing Plant 2 were therefore RBCs.

The SMS expressly provide (as do RCRA, CERCLA and MTCA generally) that all sediment cleanups must be protective of human health and the environment (WAC 173-204-570(5)). They also provide that SMS criteria for the protection of human health be developed on a site-specific basis (generally through RBCs) (WAC 173-204-570(3)(v)). For hazardous constituents for which benthic invertebrate organisms are the most sensitive receptor of concern (e.g., copper and zinc), the SMS numerical criteria are the TMCLs/FMCLs, and are applied on a point basis within the biologically active zone of the sediments (identified as the top 60 cm of the Plant 2 sediments). Sediment cleanup standards based on the SMS numerical criteria are established on a site-specific basis within an allowable range of contaminant concentrations. The SQS, also called the sediment cleanup objective, and Cleanup Screening Level (CSL), also called the minimum cleanup level (MCUL), define this range. WAC 173-340-570(4) specifies that SMS-based sediment cleanup standards shall be as close as practicable to the SQS but shall in no case exceed the minimum CSL. For this reason, for the purpose of developing TMCLs that are protective of benthic invertebrate receptors and to analyze alternatives accordingly, the SQS were used in the Boeing Plant 2 Statement of Basis for contaminants for which benthic invertebrates are the most sensitive receptor.

MTCA requires that protection of human health be based on an excess cancer risk of one in a million (1 x 10-6) for individual carcinogens, and one in one hundred thousand (1 x 10-5) for all carcinogens collectively at a site, as well as a hazard index of one for other human health risks, and for ecological risks. This is equal to EPA's hazard index standards, but considerably more stringent than EPA's excess cancer risk standards (an acceptable range between 1 x 10-4 and 1 x 10-6). Washington's excess cancer risk standards are therefore used by EPA for sites or facilities in Washington under CERCLA and RCRA. There are no state or federal numerical standards for the protection of human health, including people who eat fish and shellfish, or for other biological resources such as birds, fish, or other mammals such as river otter. Instead, cleanup levels for protection of these groups are derived, as set forth above, from RBCs. Human health RBCs are the most stringent and therefore the most important. It is EPA's long-standing policy that cleanup levels must be calculated to protect the most sensitive receptors or populations. Regional tribal members and Asian and Pacific Islander populations are known to consume more fish and shellfish than other populations. The Muckleshoot Tribe has a treaty-granted fishery in the LDW that is currently limited to salmon which live most of their lives in the open ocean. The

Suquamish Tribe's treaty-granted usual and accustomed fishing area is just north and west of the LDW and includes fish that use the LDW as part of their home range. There are no reliable studies establishing how much fish and shellfish is consumed from the LDW generally, and no reliable studies of Muckleshoot Tribe consumption rates. Due to longstanding King County Department of Health advisories warning against consumption of resident seafood from the LDW, any study of resident LDW fish and shellfish consumption would not be appropriate because it would likely be biased extremely low.

Consequently, EPA selected a study of the Tulalip Tribe's seafood consumption rate as a surrogate for the Muckleshoot Tribe, because the Tulalip Tribe fishes in a geographically similar area and is believed by EPA to have sufficiently similar overall seafood consumption patterns. A consumption rate of 97.6 grams/day of resident seafood (just over 3.5 ounces) has been used for all LDW sediment cleanup decision making. Region 10 has at times in the past made assumptions that led it to believe SMS standards were more stringent than human seafood consumption-based RBCs. Among these were assumptions that if a resident seafood species were unavailable, consumers of resident seafood would not substitute an equal amount of available resident species. Another was "fractioning" contaminant contributions to receptors within a water body among contributing sites or facilities. The SQS concentration for PCBs is 12 ppm total organic carbon normalized (ppm-OC). A protective resident LDW human seafood consumption rate based on this standard (and accepted calculations commonly based on food web modeling to derive the relationship between sediment concentration and tissue concentration of affected seafood) would be less than 1 ounce per day. Such a consumption rate would not be protective of higher seafood consuming populations.

Another important consideration with regard to RBCs as cleanup levels is that they are never set below background concentrations or practical quantitative limits (PQLs). Setting numerical cleanup levels below background is impractical due to recontamination to background concentrations. RBCs below PQLs, which define what can be measured, are similarly impractical. MTCA requires final cleanups for which RBCs are more stringent than background to achieve natural background as defined in MTCA (WAC 173-340-700(6)(d), among other places, i.e., every media cleanup section through the 700s). (Cleanups that use area or anthropogenic background as remediation levels are interim actions, WAC 173-340-360(4)(d).) At completion of the proposed Jorgensen Forge sediment removal, the backfill covering the remediated area will meet MTCA natural background (identified in EPA and Ecology approved LDW RI/FS deliverables as the Bold Survey (EPA 2008), or for metals, Ecology's 1994 Soil Background levels), or RBC based FMCLs for all hazardous constituents as established in the Plant 2 Sediments Final Decision for RCRA Corrective Action.

Surface water (i.e., the water column) is also a medium of concern in the LDW, and was for Plant 2 corrective action to the following extent. Corrective action addresses releases of hazardous constituents in all media at or from a facility, and though the water column is part of the LDW Superfund Site, once contamination in Plant 2 sediments and upland soil and groundwater have been controlled and are no longer moving into the LDW, exceedances of water quality standards in the LDW are a LDW-wide concern no longer affected by Plant 2.

Ultimate PCB and other bioaccumulative contaminant levels in sediments and surface water for the entire LDW will be determined at the end of the LDW CERCLA/MTCA process. EPA in conjunction with Ecology will consider all ongoing sources in making determinations (which may include CERCLA ARAR waivers of portions of MTCA and some surface water quality criteria), including inflowing

contaminants from the Green River system, aerial deposition, residual lateral sources, and residual LDW bed loading. Recontamination in this regard will be addressed in the LDW CERCLA/MTCA process. Removal Action levels (RvALs) and backfill levels for final actions as set forth in Section V.4 (EE/CA) below, and explained in greater detail in the EE/CA, for this NTCRA, shall be fully consistent with Plant 2 RCRA cleanup standards, and shall be met throughout the Jorgensen Forge EAA.

2. Actual or potential contamination of drinking water supplies or sensitive ecosystems.

The groundwater beneath the Facility is not potable due to marine tidal intrusion per salinity criteria in WAC 173-340-720(2). Drinking water standards are therefore not appropriate for this NTCRA. Regardless, groundwater was characterized as a potential surface water contamination source for this NTCRA. The migration pathway for discharge of groundwater is complete but concentrations of COCs have not been detected in groundwater exceeding the screening levels, with the exception of single anomalous detections of COCs in groundwater collected from single monitoring wells located in discrete areas of the RAB.

The LDW is a sensitive estuarine ecosystem in which species of salmonids listed as endangered species live as juveniles, along with the full complement of wildlife typical of such systems in urban areas of the Pacific Northwest. Estuarine intertidal and near-shore subtidal ecosystems in the LDW provide important habitat for juvenile salmonid growth, physiological transition, and predator avoidance during their outmigration. The estuarine environment also provides refuge for various marine fish during larval stages and supports an array of preferred prey for all salmonid life stages. The intertidal zone is located approximately between -4 ft and +13 ft MLLW, and the near-shore subtidal zone is just slightly deeper than the intertidal zone.

Within the intertidal areas, mudflats serve many ecosystem functions, including providing food and habitat for benthic invertebrates, fish, shorebirds, and aquatic mammals. A diverse assemblage of invertebrate species, including larvae, worms, and crustaceans, can be found in these habitats, which typically consist of unconsolidated silts and clays and sand flats of unconsolidated sandy sediments. Mudflats containing gravel may support high densities of bivalve populations.

Though limited in area, the features of the Jorgensen Forge EAA intertidal mudflat make the area suitable habitat for the organisms described above and provide potentially important habitat for organisms within the juvenile salmonid food web.

3. High levels of hazardous substances or pollutants in soils largely at or near the surface that may migrate (300.415(b)(2)(iv)).

In general, principal threat wastes (PTW) are those source materials considered to be highly toxic or highly mobile which generally cannot be contained in a reliable manner and/or would present a significant risk to human health or the environment should exposure occur. EPA believes that though certain source materials are addressed best through treatment because of technical limitations to the long-term reliability of containment technologies, or the serious consequences of exposure should a release occur; these expectations also reflect the fact that other source materials can be either safely removed (as at this EAA) or safely contained and that treatment for all waste will not be appropriate or necessary to ensure protection of human health and the environment.

While isolated sediment samples have PCBs and metals detected above levels that might constitute a principal threat, these were generally not collocated and it was not determined that there was an identifiable area that posed a principal threat. Sufficient information was not available for other contaminants to identify the presence of a PTW. In any case, the proposed action would not leave any PCBs in the subsurface above 12 ppm OC-normalized, far below any PTW threshold.

4. Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.

Contaminants found in the off-shore sediments could migrate or be released in the event of a severe flood and/or significant damage to the upriver Howard Hansen Dam. Presently, surface water from average and above average precipitation events would not impact this NTCRA. The 24-inch storm drain line which could have conveyed significant contamination into the EAA is no longer a concern due to its removal in March 2011 described above.

5. The availability of other appropriate federal or state response mechanisms to respond to the release (300.415(b)(2)(vii)).

No other federal or state response mechanisms are available. It is fully anticipated that Jorgensen will perform the work with EPA oversight pursuant to an EPA administrative order. Other than CERCLA, there are no known other appropriate federal or state response mechanisms capable of providing the appropriate resources in the prompt manner needed to address the potential human health and ecological risks associated with the Jorgensen Forge EAA.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

RvALs are based on the objective of protecting human health and the environment for exposure pathways present throughout the Jorgensen Forge EAA, i.e., sediments and bank. The overall objective has been divided into removal action objectives (RAOs), which are:

Sediment

- **Human health – seafood consumption**. Reduce human health risks associated with the consumption of resident LDW fish and shellfish to protective levels. This RAO is expected to be consistent with the RAO for future remedial actions in the LDW.

- **Human health – direct contact**. Reduce human health risks associated with exposure to COCs through direct contact with sediments and incidental sediment ingestion by reducing sediment concentrations of COCs to protective levels. This RAO is expected to be consistent with the RAO for future remedial actions in the LDW.

- **Ecological health – benthic**. Reduce toxicity to benthic invertebrates by reducing sediment concentrations of COCs to comply with the SMS.

- **Ecological health – seafood consumption**. Reduce risks to crabs, fish, birds and mammals from exposure to COCs by reducing sediment and surface water concentrations of COCs to protective levels.

Groundwater

- **Groundwater and Sediment protection.** Reduce migration of contaminants in groundwater to sediments to reduce risk to human health and the environment.

The removal action will meet these RAOs, with the exception of the RAO for human seafood consumption over the long term. The RBCs necessary to protect unlimited human seafood consumption are very stringent. The goal for the LDW as a whole is to get as close to them as practicable. Achieving them may be impossible as they are more stringent than background concentrations, including natural background as defined by MTCA (see Section III.1 above). However, this sediment removal will remove all contaminant concentrations over its aerial extent and will replace them with clean fill material meeting the backfill levels for final actions. Upon completion therefore, these formerly contaminated sediments will meet all cleanup goals and levels until they are recontaminated, to however marginal a degree, by surrounding LDW concentrations, and LDW sources generally. These later post-NTCRA levels will be addressed by the LDW Record of Decision in a manner consistent with the rest of the LDW since the Jorgensen Forge EAA will remain part of the LDW Site after this NTCRA is completed. It is important to emphasize that protective levels of some COCs, particularly PCBs, are well below background concentrations, so it will be not be possible, based on everything we know at this time, over the long term, to completely eliminate any unacceptable risk from this pathway without limiting fish consumption to some degree.

Through an evaluation of effectiveness, implementability and costs, the proposed action (Alternative 2 in the EE/CA) was selected as the proposed removal action. The selection of this alternative was not revised in response to public comment.

1. Proposed action description

Through an evaluation of effectiveness, implementability and costs, the proposed action (Alternative 4 in the EE/CA) was selected as the proposed removal action. The selection of this alternative was not revised in response to public comment.

The proposed action consists of excavation of the bank and sediments within the EAA exceeding removal action levels (RvALs); backfill of material that meets RBCs to protect finfish and shellfish consumers; storm water management; and long-term sediment and groundwater monitoring to determine that the removal objectives are achieved within the approximately 1.6 acre Jorgensen Forge EAA (Figure 2). The actions include:

- Removal of contaminated sediment and soil with disposal at an off-site commercial disposal facility, followed by backfilling with clean material, as detailed below:

- Dredge approximately 21,000 cubic yards (cy) of contaminated sediment, bank soil, and other debris from EAA (Figure 2). This variable depth dredging (2-10+ feet) will remove all sediments with contaminant concentrations higher than the RvALs for all COCs. Clean backfill material (16,200 cy) that meet RBCs (consistent with Boeing Plant 2 TMCLs) will be placed in the clean dredged prism and be re-contoured to original contours, as appropriate.

- Prior to backfilling, collect confirmation samples on newly exposed surfaces to document the nature of the material beneath the backfilled area. In the sediments dredging will continue until the RvALs are reached.

- Dispose of dredged material in an off-site landfill that meets all state and federal requirements for disposal of such materials.

- Install or construct supporting facilities, staging areas, drainage and erosion controls, and effective decontamination facilities prior to initiation of the NTCRA.

- Water Control Systems.

  - Baseline groundwater monitoring, during and after removal action, is required to demonstrate that the bank action adequately removed contaminants which caused groundwater to exceed RvALs. If groundwater exceedances persist, additional measures will be evaluated.

  - Dewatering of sediments must be monitored to ensure contaminants are not re-introduced into the water column during removal activities.

  - Storm water must be monitored to ensure any water released to the LDW will not result in recontamination of sediments or harmful exposures to benthic organisms.

- Institutional controls. The Washington State Department of Health has issued a fish consumption advisory for the LDW. Further fish consumption advisories, public education programs and/or limitations with respect to the Jorgensen Forge EAA will be re-evaluated in the LDW-wide remedial decision making process.

- Performance of long-term monitoring and reporting. Long-term monitoring and reporting is required to measure initial efficacy and recontamination. A Long-Term Monitoring and Reporting Plan must be developed to specify monitoring activities, including frequencies and protocols. Recontamination from other than Jorgensen Forge sources will be addressed as part of the future long-term monitoring plan for the LDW.

2. Contribution to remedial performance

The Jorgensen Forge EAA NTCRA will remove all contaminated sediments and sources to those sediments above RvALs and replacing them with backfill that meets the backfill levels for final actions as previously stated, within the Jorgensen Forge EAA, a delineated PCB sediment hot spot from the LDW RI. They will thereby eliminate in the short term, and reduce over the long term, exposures to

Jorgensen Forge receptors while fully complementing and contributing to the long-term remediation of the LDW Site pursuant to CERCLA and the NCP.

3. Description of alternative technologies

Candidate technologies for sediment remediation were identified and screened prior to developing alternatives for further engineering analysis, and then further refined to a preferred alternative in EE/CA. General categories of removal action technologies considered at the screening stage included: no action, institutional controls, monitored natural recovery and enhanced natural recovery (MNR/ENR), containment, in-situ treatment, removal and treatment, and removal and disposal. Each of these candidate technologies were evaluated based on effectiveness, implementability, and cost. All technologies except partial contaminant removal/ capping and disposal, as well as full removal and disposal (along with no action for comparative purposes only) were eliminated at the screening stage from further consideration due to lack of sufficient projected efficacy, low expected technical feasibility, and/or excessive comparative cost ineffectiveness, i.e., technologies that were not cost-effective relative to other equally-protective options were also not retained.

4. Engineering Evaluation/Cost Analysis (EE/CA)

The final EE/CA will be approved within 30 days of the issuance of this document once public comments are incorporated and addressed. A 30-day public comment period was held from June 01, 2011 through June 30, 2011, during which 2 comments were received and comments were recorded by a court reporter at the June 16, 2011, public meeting. The EE/CA Responsiveness Summary is Attachment A. Other supporting documentation is found in the project administrative record.

The four active alternatives carried through the EE/CA, along with the no action alternative, differed principally in the amount of sediment contamination left in the EAA upon completion of the NTCRA. The selected remedy removes all contaminated sediment in the EAA above RvALs, and replaces it with clean backfilling material. This will allow all cleanup goals and levels for sediments however stringent, to be met over the aerial extent of the sediment action for the very short term, before any recontamination from surrounding concentrations or sources occurs. However, the sediment RvALs listed below are limited, e.g., for PCBs, to the SQS of the SMS numerical standards (for protection of benthic invertebrates) because: 1) the rate at which PCB levels could rise above the very stringent RBC or background levels is unknown but some recontamination is all but certain to occur; 2) these recontamination levels are not in any case projected to rise above SQS concentrations; and 3) the Jorgensen Forge EAA will remain part of the LDW Site subject to its remedial action decisions with regard to whatever contaminant levels may reoccur.

The rejected active alternatives removed substantially less contaminated sediment and contained all remaining contaminated sediments under an engineered cap (of varying sizes). When consideration of the cost of the fourth alternative that removes and disposes of all EAA contaminated sediments above

RvALs was compared to the cost of removing fewer sediments and designing, building, monitoring, maintaining and assuring an engineered cap, the difference amounted to an approximately 7 percent cost increment. The selection of this action was readily apparent and fully concurred on by the State and the Tribe. This action was also enthusiastically supported by the community as well (see Responsiveness Summary, Attachment A).

RvALs selected in the EE/CA are as follows:

Jorgensen Forge EAA Sediment RvALs and RBCs (for backfill material)

All concentrations in mg/kg (ppm)

Constituent	SQS/RvALs	RBC[1]	Background (S/B)[2]	PQL	Backfill Levels for Final Actions
PCBs[3]	12 ppm OC	0.00006		0.03	0.03
Cadmium	5.1	4	0.77/0.9	na	<5.1
Lead	450	250	24/21.6	na	250
Chromium[4]	260	1.2	none/67.6	na	67.6
Copper	390	80	36/49.9	na	49.9
Mercury[5]	0.41	1.5	0.07/0.2	na	<0.41
Silver	6.1	170	none/0.3	na	<6.1
Zinc	410	1,400	85/94.6	na	<410
Arsenic	51	20	20/13.6	na	13.6

1 - These RBCs (for purposes of comparison) are from the Boeing Plant 2 *Target Media Cleanup Level Technical Memorandum (Boeing, 2011)*

2 - Background values are from the Ecology State-Wide Natural Background for Metals in Soil ("Soil Background ") (October 1994), the "S" column, or from the OSV Bold Study ("Bold Background"), (EPA, 2008) identified in the "B" column

3- SQS values are based on parts per million total organic carbon, whereas the backfill levels for final actions PCB values are based on total PCBs without organic carbon normalization.

4 - The Chromium SQS and RBC values are based on hexavalent chromium, whereas the background are based on tri-valient chromium. This distinction is discussed in depth in the explanation of selection text for chromium.

5 - Mercury values are based on elemental mercury

5. Applicable or relevant and appropriate requirements (ARARs)

SMS numerical standards will be fully complied with. Primary federal ARARs include the Clean Water Act (CWA), particularly Sections 303-304 and 404. Primary State ARARs include MTCA, the SMS and state water quality standards. Some Federal/State water quality criteria/standards for some contaminants and some portions of MTCA (over the long term as described above) may not be met through this action.

Aquatic organisms, including seafood, in water body sites like the LDW (including all its EAAs) are exposed to COCs in the water column, which is part of the areal extent of contamination from releases at or from the site. Many federal water quality criteria and/or state standards are calculated to protect such organisms, either directly as ecologically-based criteria, or to protect human seafood consumers (other water quality criteria or standards are based on drinking water exposures which are not relevant to the LDW, a marine estuary). Water quality is improved by removing sources of COCs to the water by actions like the sediment action selected in this Action Memorandum. Improvement in water quality in localized areas following source removal can be dramatic.

The actions selected in this Action Memorandum will improve water quality in the LDW to an unknown degree, likely most demonstrably within the EAA and areas in its immediate proximity. Monitoring water quality with the legal standards as the goal to the extent practicable is fully consistent with CERCLA and the NCP, especially since this NTCRA constitutes "early action" that would otherwise be taken later as remedial action. This temporal distinction provides no basis for an alternate standard regarding promulgated requirements, since the only distinguishing legal feature of the early action standard is that it is merely to the extent practicable. Early actions and subsequent remedial actions at an NPL site should have the same goals and standards before them. Having such consistency does not prolong, extend, alter or harm the early action or subsequent remedial action, To the extent that water quality criteria or standards or any other ARARs, including portions of MTCA, prove unachievable at the LDW Site, including its EAAs, they may be subject to waiver pursuant to Section 121(d)(4) of CERCLA prior to completion of LDW remedial action.

Sediment removal standards (RvALs) have been developed based primarily on the SMS in a manner consistent with many CERCLA removal and remedial actions in Washington over at least the last decade. The SMS are part of MTCA (when they are employed to address contaminated sediments at CERCLA or MTCA sites, and prescribe numerical criteria for the protection of benthic invertebrate organisms), and may function independently for other applications, In-water dredging and filling shall comply with regulation pursuant to Section 404 of the CWA.

EPA will prepare a Biological Assessment that evaluates the potential effects on threatened and endangered species from this NTCRA, along with an evaluation of Essential Fish Habitat (EFH), and will consult with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (FWS) (together, the "Services") and obtain a Biological Opinion prior to NTCRA implementation, particularly with respect to the taking of listed fish (NMFS has jurisdiction over commercial fisheries and FWS has jurisdiction over sport fisheries; salmon among other species are both commercial and sport species).

Off-site activities will comply with all applicable local, state, and federal laws, including the Off-Site Disposal Rule (40 CFR 300.440).

6. Project schedule

The project schedule for is anticipated to be set forth in the anticipated enforcement order on consent (Statement of Work) issued to Jorgensen for this NTCRA. The construction phase of this project is currently scheduled for September 2012 through December 2013.

B. Estimated Costs

The projected costs to implement this NTCRA are estimated at $7.09 million (see Section 7.3 of the EE/CA).

EPA estimated costs per this Action Memorandum are anticipated only for costs associated with oversight of work performed by the PRPs. This work includes, but is not limited to, review and comments on required deliverables, field oversight of work, and other EPA responsibilities with respect to implementation of this removal action. If EPA were to undertake implementation of the work described in this Action Memorandum, with its own resources, an Action Memorandum Amendment

and cost Ceiling Increase would be required. Oversight funds will be recovered jointly from the Jorgensen Forge Corporation and Earle M. Jorgensen, Inc.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

If the proposed removal action should be delayed or not taken, hazardous substances will remain as potential human health and ecological threats, and hazardous substances will remain a continuing source of solid and dissolved-phase contaminants to the environment until the remedial action for LDW is selected and implemented.

VII. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues at this site.

VIII. COMMUNITY RELATIONS

Throughout the development of the EE/CA, and the development of the completed LDW RI and ongoing FS, EPA has provided access to any and all interested persons to all draft and final submissions under the Jorgensen Forge EE/CA and LDW RI/FS Orders on Consent, on one or more sponsored websites, and has held regular briefings with stakeholders at numerous key points in the process. EPA also consulted with the community, formally and informally, with and without the Duwamish River Cleanup Coalition (DRCC), EPA's Technical Advisory Group (TAG) for the LDW site.

The EE/CA was available for public review and comment from June 1 through June 30, 2011. Notice of this comment period was published in the *West Seattle Herald, South Seattle Beacon* and *Highline Times* at the start of the 30-day public comment period. Notice of the comment period, public meeting, and a summary of the proposed EE/CA alternatives were described in a Jorgensen Forge Fact Sheet (May 2011) and mailed to addresses in the zip codes in South Park and neighboring Georgetown. Fact sheets in Spanish were also distributed. Announcements were placed on EPA's website, the EPA web calendar, the City of Seattle Neighborhoods web calendars, and on the South Park, West Seattle, and Georgetown blogs and listservs.

EPA provided information about the comment period, public meeting, and EE/CA at several community events and neighborhood meetings, primarily at the South Park and Georgetown Neighborhood Association monthly meetings from January through May. Fliers announcing the public meeting in English and Spanish were distributed in the immediate Jorgensen Forge neighborhood.

Public outreach was also performed by DRCC-TAG. EPA included DRCC-TAG's public meeting flier in English and Spanish in EPA's Jorgensen Forge Fact Sheet mailing. EPA held a public meeting in the South Park neighborhood on June 16, 2011, attended by approximately 50 people. Public comments were recorded by a court reporter. EPA also received 4 comment letters and comment forms during the public comment period, and 4 individuals provided spoken comment at the public meeting. Responses to all significant comments are provided in the Responsiveness Summary (Attachment A).

An Administrative Record was prepared for this action and notice of availability of that record was published in the above-referenced newspapers and the Superfund Fact Sheet. The Administrative Record

was available at EPA, and copies of key documents were made available at the South Park Library which is an information repository, at the Region 10 EPA HQ Library, and on the EPA Region 10 Jorgensen Forge website and via CD-ROM.

IX. ENFORCEMENT

It is anticipated that this removal action will be implemented by Jorgensen pursuant to an enforcement Order on Consent. If a consent order were to prove unachievable for any reason, EPA would likely issue a unilateral order. Alternatively, EPA could include this action as part of the LDW ROD if action has not been taken by that time. In any case the LDW ROD will acknowledge this EAA when that ROD issued, and the EAA will remain a part of the LDW Site.

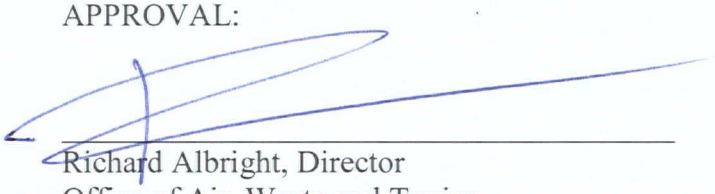
X. RECOMMENDATION

This decision document sets forth the selected removal action for the Jorgensen Forge EAA of the LDW Superfund Site, Tukwila, King County, Washington, that has been developed in accordance with CERCLA, and is consistent with the NCP. This decision is based on the administrative record for the EAA and the Site.

Conditions at the EAA meet the NCP 40 C.F.R. § 300.415(b) criteria for a removal action and I recommend your approval of the proposed removal action. The proposed removal action is expected to be conducted by the PRPs with oversight by EPA.

IX. APPROVAL/DISAPPROVAL

APPROVAL:



30 Sept 2011

Richard Albright, Director
Office of Air, Waste and Toxics

Date

DISAPPROVAL:

Richard Albright, Director
Office of Air Waste and Toxics

Date

FIGURES

1. Site Location Map

2. Jorgensen Forge facility and RAB

ATTACHMENT

1. Responsiveness Summary (Response to Comments)

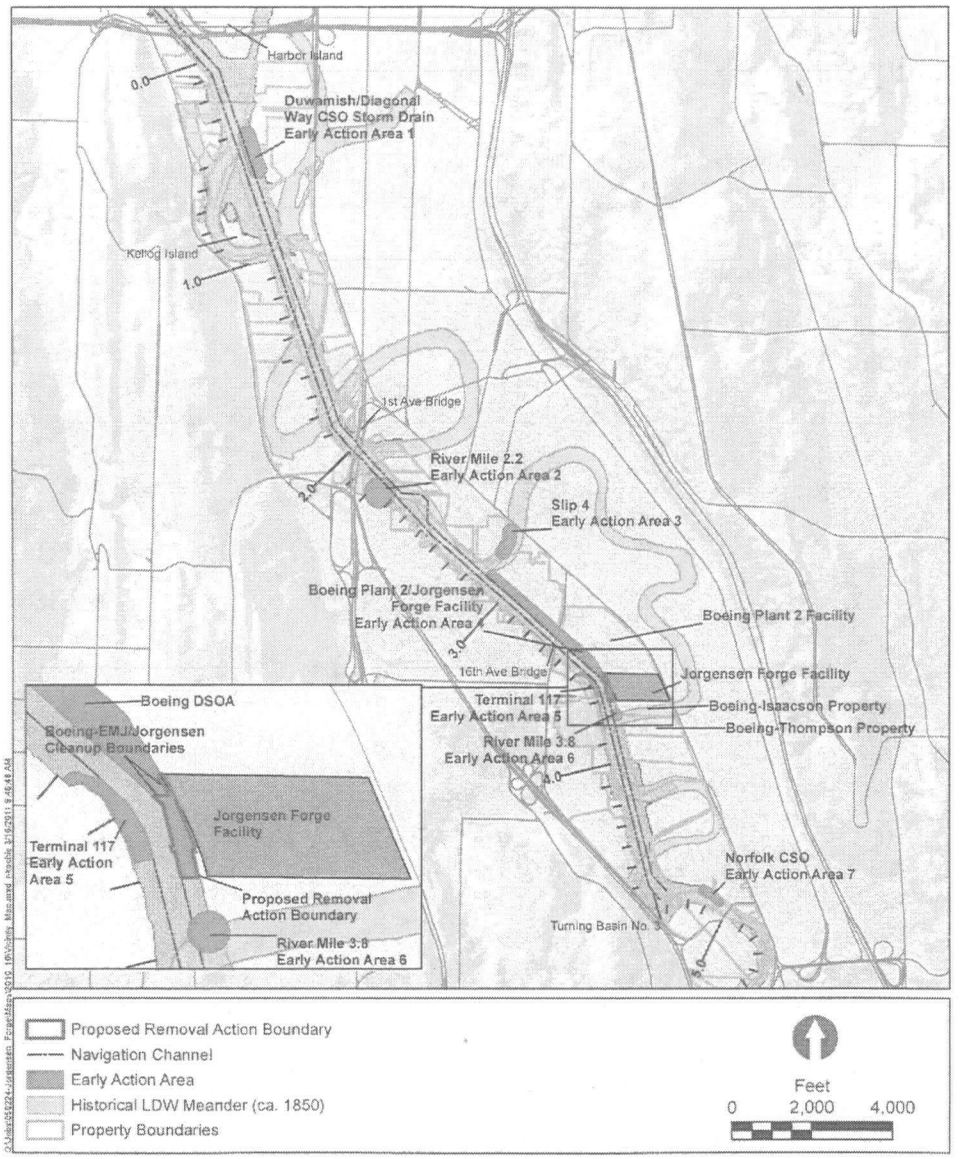

Harbor Island
0.0
Duwamish/Diagonal
Way CSO Storm Drain
Early Action Area 1
Kellog Island
1.0
1st Ave Bridge
River Mile 2.2
Early Action Area 2
2.0
Slip 4
Early Action Area 3
Boeing Plant 2/Jorgensen
Forge Facility
Early Action Area 4
Boeing Plant 2 Facility
3.0
16th Ave Bridge
Jorgensen Forge Facility
Terminal 117
Early Action Area 5
Boeing-Isaacson Property
Boeing-Thompson Property
River Mile 3.8
Early Action Area 6
4.0
Norfolk CSO
Early Action Area 7
Turning Basin No. 3
5.0
Boeing DSOA
Boeing-EMJ/Jorgensen
Cleanup Boundaries
Jorgensen Forge
Facility
Terminal 117
Early Action
Area 5
Proposed Removal
Action Boundary
River Mile 3.8
Early Action Area 6
Proposed Removal Action Boundary
Navigation Channel
Early Action Area
Historical LDW Meander (ca. 1850)
Property Boundaries
Feet
0
2,000
4,000

Figure 1

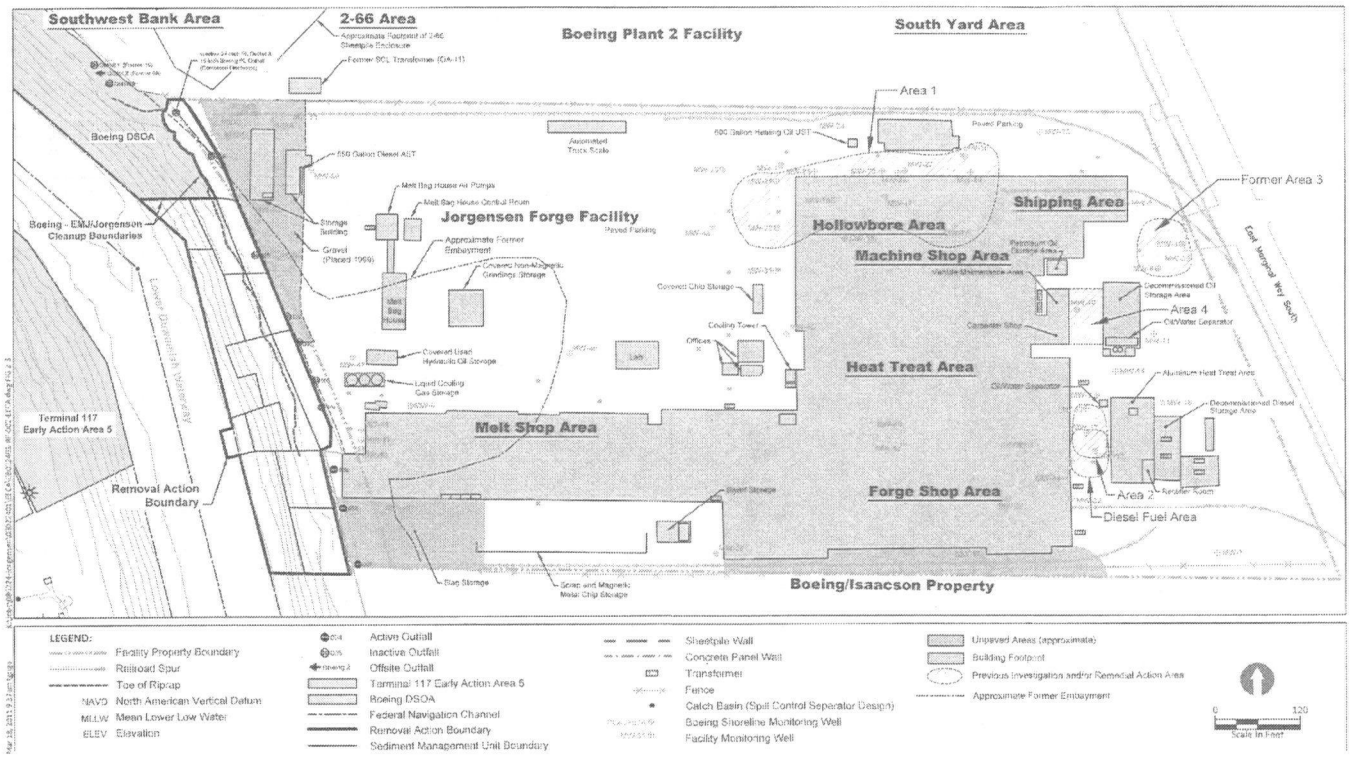

Southwest Bank Area
2-66 Area
Boeing Plant 2 Facility
South Yard Area
Area 1
Boeing DSOA
Jorgensen Forge Facility
Shipping Area
Former Area 3
Hollowbore Area
Machine Shop Area
Boeing - EMJ/Jorgensen Cleanup Boundaries
Area 4
Heat Treat Area
Terminal 117 Early Action Area 5
Melt Shop Area
Removal Action Boundary
Forge Shop Area
Area 2
Diesel Fuel Area
Boeing/Isaacson Property
LEGEND:
Facility Property Boundary
Railroad Spur
Toe of Riprap
NAVD North American Vertical Datum
MLLW Mean Lower Low Water
ELEV Elevation
Active Outfall
Inactive Outfall
Offsite Outfall
Terminal 117 Early Action Area 5
Boeing DSOA
Federal Navigation Channel
Removal Action Boundary
Sediment Management Unit Boundary
Sheetpile Wall
Concrete Panel Wall
Transformer
Fence
Catch Basin (Spill Control Separator Design)
Boeing Shoreline Monitoring Well
Facility Monitoring Well
Unpaved Areas (approximate)
Building Footprint
Previous Investigation and/or Remedial Action Area
Approximate Former Embayment
0
120
Scale in Feet

Figure 2

ATTACHMENT A

RESPONSE TO COMMENTS

Below are the comments received by the EPA during the public comment period on the Engineering Evaluation/Cost Analysis for the Jorgensen Forge Early Action Area. Included with each comment is EPA's response. The comments are divided into two categories - summary comments and specific comments. Summary comments represent those similar comments received by multiple entities where multiple parties provided the same input. Specific comments are those EPA believes should be addressed individually.

SUMMARY COMMENTS

COMMENT 1: Paraphrase "We support the selection of Alternative 4 for the Jorgensen Forge sediment removal action". Duwamish River Cleanup Coalition, the Muckleshoot Indian Tribe, People for Puget Sound, Jesse Moore, Georgetown, Jordan Monez, South Park, BJ Cummings, Seattle, M.C. Halvorsen.

EPA RESPONSE: Comment noted.

COMMENT 2: Paraphrase "We/I are concerned with the possibility of suspended sediments moving around and contaminating other areas of the waterway during the remediation". The Duwamish River Cleanup Coalition, the Muckleshoot Indian Tribe, BJ Cummings, Seattle.

EPA RESPONSE: EPA recognizes the possibility suspended sediment migration and will require aggressive monitoring before, during, and after construction, coupled with best management practices and cutting edge technologies to ensure minimal impact to sediments outside of the Jorgensen Forge boundaries.

COMMENT 3: Paraphrase "Source control for the entire Duwamish and Green River must be completed to ensure that remedies downstream are not recontaminated." The Duwamish River Cleanup Coalition, the Muckleshoot Indian Tribe, BJ Cummings, Seattle.

EPA RESPONSE: Source control for the Duwamish and Green River is being performed by the Washington State Department of Ecology as the lead agency.

COMMENT 4: Paraphrase "The technologies to be used in the cleanup must be better identified and explained to the public in more detail to ensure it is the best available technology. This information should be part of the Engineering Evaluation/ Cost Analysis ("EE/CA")". The Duwamish River Cleanup Coalition, the Muckleshoot Indian Tribe, BJ Cummings, Seattle.

EPA RESPONSE: EPA agrees that more specificity regarding the technologies to be used will better facilitate public understanding. To that end, a new section was added to the EE/CA and a presentation by Jorgensen Forge and Boeing was provided to the stakeholders.

SPECIFIC COMMENTS

COMMENT 1

" Hello,

As an interested party studying the Duwamish River Cleanup from the perspective of a landscape architecture student, I hope to see the Jorgenson Forge cleanup have stringent cleanup standards that have the smallest footprint possible. I think that the plan should incorporate options for locally dealing with contamination as much as possible, rather than sending it to another site in Central Washington, and think about future land uses while cleanup is beginning, to get the most out of taxpayer and responsible party dollars. Thank you for your time and consideration.

Best,

Jordan Monez"

EPA RESPONSE: Thank you for your comment. Due to the variety of contaminants present in the sediments to be dredged, including PCBs, local disposal is not an option. PCBs at these levels can only be placed in an approved landfill or incinerated. Incineration is not practicable since the nearest facility that can thermally treat PCBs is located in Utah. The treated materials would not be able to be reused at the Facility due to physical limitations. EPA believes disposal in an approved landfill will result in an equally protective cleanup at a reduced cost.

COMMENT 2

Email:
Subject: Duwamish River Superfund Site: Jorgensen Forge
6/29/2011

Shawn Blocker
US EPA Region 10

I believe that the way that Seattle manages the places where our waters and shores meet is tied to our City's future, the health of its habitants and the long term strength of its economy -- and that clean water and a healthy environment will be the two most important factors in determining long term livability and economic stability for our area and our nation.

The EPA's Jorgensen Forge Clean Up Alternative 4 appears to be the best alternative for achieving the goal of protecting life in the river and citizens fishing for food there -- I support it.

Care should be taken to evaluate the Jorgensen site and all future sites around the Duwamish to ensure that the best possible available technology for sediment removal and related work is used in order to

minimize health impacts on the surrounding community during clean-up.

Protecting the investment we are making in cleaning the Duwamish River is essential. Cooperation at all levels of government is needed here. Upriver pollution sources, continuing as they are, will likely damage the people's investment in clean-up. A system of reduction, control and monitoring of pollutants entering the lower Duwamish from upstream must be included in the River-wide clean-up plan if long term success is our goal.

Thank you for all your work on our behalf,

Jesse Moore

Georgetown, Seattle

EPA RESPONSE: Comment noted the Washington State Department of Ecology is the lead agency for source control. Coordination between EPA and other interested parties and government entities will continue in the future. .

COMMENT 3

Paraphrase: "will there be air monitoring during the construction and will there be a notice to mariners to ensure the safety of ship traffic during the removal action?"

Bill Owens, South Park Resident

EPA RESPONSE: The answer is "yes" to both. A full description of the air monitoring program will be included in the NTCRA Work Plan (the next formal submittal by Jorgensen) to be issued in the winter of 2011 or spring of 2012 and will be available for public review.

COMMENT 4

"The JF EE/CA lacks an executive summary. Executive Summaries are recommended in EPA's Fact sheet entitled "Conducting Non-Time-Critical Removal Actions under CERCLA (EPA/540/F-94/009)" because they provide a general overview of the contents of the EE/CA and makes the EE/CA more accessible for the public to review. The public and Environmental Justice communities are put at a disadvantage in reviewing the Draft EE/CA because of the absence of an Executive Summary. DRCC/TAG requests that an Executive Summary be prepared for the final JF EE/CA, and that all other Lower Duwamish Waterway Early Action and riverwide cleanup documents include an Executive Summary."

Duwamish River Cleanup Coalition

EPA RESPONSE: Comment noted. Though executive summaries are recommended, they are not required and were not part of the Statement of Work for this Order, and therefore will not be included in this instance. Extensive community involvement was performed prior to the issuance of the EE/CA, with EPA presenting summaries of the proposals to community groups in Georgetown and South Park.

COMMENT 5

"Institutional controls (ICs) are inadequately addressed in the EE/CA. Fishing advisories alone are not sufficient as institutional controls to protect human health during this early action. The Duwamish River fishing populations are environmental justice communities, comprised of tribal, low income/ homeless, and immigrant communities who rely on the river both for subsistence and maintaining fishing-related family and cultural traditions. The JF EE/CA needs to incorporate, at a *minimum*, ICs comparable to those being developed for the larger LDW Superfund Site, as reflected in EPA's, DRCC/TAG's, and the Muckleshoot and Suquamish Tribe's comments on LDWG's Draft FS. EPA's IC Guidance document (November 2010) recommends that an Institutional Control Implementation and Assurance Plan (ICIAP) be developed as early as possible for both early action cleanups and site-wide cleanup plans. DRCC/TAG supports this recommendation and requests that an ICIAP be developed, with public review, for JF, as well as for T-117 and Boeing Plant 2."

Duwamish River Cleanup Coalition

EPA RESPONSE: EPA agrees that Fish advisories alone are not sufficient as the sole institutional control. Specific institutional controls will be contained in the NTCRA Work Plan which will be available for stakeholder review. An Institutional Control Implementation and Assurance Plan (ICIAP) was be prepared as part of the NTCRA Work Plan. Future IC's may be applied as part of the larger LDW Superfund Site.

COMMENT 6

"NPDES permits often exceed water quality standards (WQS); JF's NPDES permits are no exception. We are pleased to hear that JF has agreed to install technology onsite to assist with the attainment of WQS for the Superfund Site. JF's NPDES discharge permit should be revised immediately to reflect this new requirement".

Duwamish River Cleanup Coalition

EPA RESPONSE: EPA understands that The Washington State Department of Ecology is currently revising the permit.

COMMENT 7

"The remedial design should specify that the clean backfill will be "certified PCB-free," have metals concentrations less than or equal to natural background concentrations. The protectiveness of the selected corrective action is largely due to the clean backfill replacing the excavated sediments. This specification for the backfill is also important for detecting any recontamination of the sediments onsite."

Duwamish River Cleanup Coalition

EPA RESPONSE: As stated in the EE/CA, PCB concentrations in the backfill material will not exceed the natural background value of 0.002 parts per million of PCBs. Metals concentrations will not exceed

the risk based calculations contained in the Boeing Plant 2 Target Media Cleanup Level Technical Memorandum (Boeing 2010) or the natural background values, whichever is less restrictive.

COMMENT 8

"Appropriate consideration should be given to the selection of a disposal facility for contaminated soil and dredge spoils to ensure that the contamination is not transferred from one community to another. Local options for disposal and treatment need to be considered and publicly reviewed in order to prevent or minimize the transference of contaminated materials to another location".

Duwamish River Cleanup Coalition

EPA RESPONSE: See response to specific comment #1.

Action Memorandum Check Sheet[1]

Coordination with or obtained:	Y/N	Contact Info or Comment:
Acct No. and/or CERCLIS No. obtained	Y	
ATSDR coordination	N	
Community Involvement/Press coordination	Y	KEVIN MTYLOR
Contracts (ERRS, START)	N	NONE NEEDED
Dept of Agriculture (Forest Service lands)	N	N/A
Dept of Commerce/National Marine Fisheries (ESA) issues considered	Y	BA TO SERVICES IN 8/11
Dept of Interior (ESA) issues considered	N	N/A
Hanford Project Office coordination	N	N/A
IGCE completed, if required	N	N/A
NPL coordination	N	N/A
ORC coordination/concurrence	Y	CHARLES CROMER
PRP search initiated	N	N/A
Admin Record established	Y	
State coordination	Y	
Operations Office coordination	N	N/A
Tribal Office coordination	N*	ALREADY CONSULTING W 3 TRIBES
Tribal (cultural and natural resources) issues considered	Y	USE TRIBAL RISK FRAMEWORK

Original to: Records Center (Admin Record)
Copies to: Lynne Kershner (CERCLIS reporting)
Mike Sibley (ERRS)
Mary Matthews (ER Program file)
~~Originating OSC (personal file)~~

[1] This check sheet is **required** for all Action Memos and is to be used as a guide for OSCs and RPMs to ensure proper communication and coordination with various stakeholders. With the exception of ORC, formal concurrence is not required but items should be considered prior to routing an Action Memo for signature. Check sheet should be included with formal signature package.

Created on 10/4/2006 12:59:24 PM

Author: Shawn Blocker	Date: December ??, 2010
Mailing instructions: **CERTIFIED MAIL - RETURN RECEIPT REQUESTED**	
Subject: Final Comments on the Second Draft Engineering Evaluation/Cost Analysis, Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington, Comprehensive Environmental Response, Compensation, and Liability Act Administrative Order on Consent (EPA Docket No. CERCLA-10-2003-001)	
File Name/Location: LDW – Jorgensen Forge – **(Superfund Record Center eventually)**	
Signer: Shawn Blocker	

CONCURRENCES:

NAME	**Blocker**	**PEER REVIEW**	**Ordine**	**ALBRIGHT**	**POLICY FILE**	**RCRIS INFO SUBMITTED**
INITIALS		**see below**		**N/A**	**NO**	**N/A**
DATE						

PEER REVIEW:

NAME	**ARRIGONI**	**CASTRILLI**	**BROWN**	**HEEDEEN**	**MEYER**	**PALUMBO**	**FISHER**
Initials							
Date							

ACTIONS/ADDITIONAL INFORMATION:
Mailing deadline: December 2010
bcc: Charles Ordine, ORC Allison Hiltner, Kris Flint, ECL Christy Brown, Shawn Blocker AWT Kendra Tyler, ETPA Piper Peterson-Lee, ECL LOR: COHEN ECL KAREN KEETY, ECL
Filing Instructions: This is a CERCLA site and eventually records will go down to the SF Records Center. When the confirmation of receipt comes back, return the file copy to Christy or Shawn who will ensure it makes it to SF Records.